**Claims:**

1. A nozzle for an injection molding apparatus, said injection molding apparatus including a manifold, and a mold component, said manifold having at least one runner therein, said at least one runner being downstream from a melt source, said mold component defining at least one mold cavity, said mold component defining a gate into each mold cavity, said gate defining an axis, said mold component having a mold component alignment surface thereon, said nozzle comprising:

a nozzle body, wherein said nozzle body defines a nozzle body melt passage, said nozzle body melt passage is adapted to be in fluid communication with and downstream from said at least one runner;

a tip that is removably connected to said nozzle body, wherein said tip defines a tip melt passage, said tip melt passage is downstream from and in fluid communication with said nozzle body melt passage, and said tip melt passage is adapted to be upstream from and in fluid communication with said gate;

a tip surrounding piece that is removably connected with respect to said nozzle body; and

an alignment piece positioned between said tip and said tip surrounding piece, and

wherein said tip contacts said alignment piece to align said tip with respect to said alignment piece, wherein said alignment piece contacts said tip surrounding piece to align said alignment piece with respect to said tip surrounding piece, and wherein said tip surrounding piece is adapted to contact said mold component to align said tip surrounding piece with respect to said gate, so that said tip is aligned with respect to said gate, and wherein said contact between said tip, said alignment piece, said tip surrounding piece and said mold component are all adapted to be axially proximate said gate.

2. A nozzle as claimed in claim 1, wherein said tip has a tip thermal conductivity, said alignment piece has an alignment piece thermal

conductivity, and said alignment piece thermal conductivity is less than said tip thermal conductivity.

3. A nozzle as claimed in claim 1, wherein said tip surrounding piece has a tip surrounding piece thermal conductivity and said tip has a tip thermal conductivity and said tip surrounding piece thermal conductivity is less than said tip thermal conductivity.

4. A nozzle as claimed in claim 1, wherein said tip surrounding piece is adapted to inhibit heat transfer between said nozzle and said mold component.

5. A nozzle as claimed in claim 1, wherein said tip surrounding piece is adapted to cooperate with said mold component to form a seal to inhibit melt leakage therebetween.

6. A nozzle as claimed in claim 1, wherein said tip has a first threaded portion and said nozzle body has a second threaded portion that mates with said first threaded portion.

7. A nozzle as claimed in claim 6, wherein said tip surrounding piece has a third threaded portion and said nozzle body has a fourth threaded portion that mates with said third threaded portion.

8. A nozzle as claimed in claim 1, wherein said tip is removably attached to said nozzle body.

9. A nozzle as claimed in claim 1, wherein said tip surrounding piece retains said tip in place.

10. A nozzle as claimed in claim 1, wherein said tip surrounding piece has a tip surrounding piece thermal conductivity and said alignment piece has an

alignment piece thermal conductivity and said tip surrounding piece thermal conductivity is less than said tip surrounding piece thermal conductivity.

11. A nozzle as claimed in claim 1, wherein a portion of said tip surrounding piece is adapted to contact said mold component and is sized so that a selected heat transfer occurs between said tip surrounding piece and said mold component.

12. A nozzle as claimed in claim 1, wherein said tip includes a torpedo portion that extends at least to said gate, said torpedo portion being configured for transmitting heat from said heater into melt entering said gate.

13. A nozzle as claimed in claim 1, further comprising a valve pin system that includes a valve pin and an actuator, wherein said valve pin has a closing surface and is movable through said tip melt channel between a closed position wherein said closing surface is adapted to cooperate with said gate to inhibit melt flow through said gate, and an open position wherein said valve pin is adapted to be spaced from said gate to permit melt flow through said gate, said valve pin has a valve pin alignment surface, said tip has a tip alignment surface positioned in said tip melt channel, and said valve pin alignment surface and said tip alignment surface are adapted to cooperate to align said valve pin with respect to said tip and with respect to said gate, and wherein said actuator is operatively connected to said valve pin.

14. A nozzle as claimed in claim 13, wherein said valve pin alignment surface is separate from said closing surface.

15. A nozzle as claimed in claim 1, wherein said tip has a tip alignment surface that is frusto-conical and said alignment piece has an alignment piece alignment surface that is configured to mate with said tip alignment surface.

16. A nozzle as claimed in claim 1, further comprising a heater, wherein said heater is thermally connected to said nozzle body for heating melt in said nozzle body melt passage.

17. An injection molding apparatus, comprising:

a manifold, a mold component and at least one nozzle,

wherein said manifold has at least one runner therein and said at least one runner is adapted to be downstream from a melt source,

wherein said mold component defines at least one mold cavity, said mold component defines a gate into each mold cavity, each said gate defines an axis, and said mold component has at least one mold component alignment surface thereon,

wherein each said nozzle includes a nozzle body, a tip, a tip surrounding piece, and an alignment piece,

wherein said nozzle body defines a nozzle body melt passage, and said nozzle body melt passage is in fluid communication with and downstream from one of said at least one runner,

wherein said tip is removably connected to said nozzle body, wherein said tip defines a tip melt passage, said tip melt passage is downstream from and in fluid communication with said nozzle body melt passage, and is upstream from and in fluid communication with said gate,

wherein said tip surrounding piece is removably connected with respect to said nozzle body,

wherein said alignment piece is positioned between said tip and said tip surrounding piece, and

wherein said tip contacts said alignment piece to align said tip with respect to said alignment piece, wherein said alignment piece contacts said tip surrounding piece to align said alignment piece with respect to said tip surrounding piece, and wherein said tip surrounding piece contacts one of said at least one mold component alignment surface to align said tip surrounding piece with respect to said gate, so that said tip is aligned with respect to said gate, and wherein said contact between said tip, said

alignment piece, said tip surrounding piece and said mold component are all axially proximate said gate.

18. An injection molding apparatus as claimed in claim 17, wherein said tip has a tip thermal conductivity, said alignment piece has an alignment piece thermal conductivity, and said alignment piece thermal conductivity is less than said tip thermal conductivity.

19. An injection molding apparatus as claimed in claim 17, wherein said tip surrounding piece has a tip surrounding piece thermal conductivity and said tip has a tip thermal conductivity and said tip surrounding piece thermal conductivity is less than said tip thermal conductivity.

20. An injection molding apparatus as claimed in claim 17, wherein said tip surrounding piece is adapted to inhibit heat transfer between said nozzle and said mold component.

21. An injection molding apparatus as claimed in claim 17, wherein said tip surrounding piece cooperates with said mold component to form a seal to inhibit melt leakage therebetween.

22. An injection molding apparatus as claimed in claim 17, wherein said tip has a first threaded portion and said nozzle body has a second threaded portion that mates with said first threaded portion.

23. An injection molding apparatus as claimed in claim 22, wherein said tip surrounding piece has a third threaded portion and said nozzle body has a fourth threaded portion that mates with said third threaded portion.

24. An injection molding apparatus as claimed in claim 17, wherein said tip is removably attached to said nozzle body.

25. An injection molding apparatus as claimed in claim 17, wherein said tip surrounding piece retains said tip in place.

26. An injection molding apparatus as claimed in claim 17, wherein said tip surrounding piece has a tip surrounding piece thermal conductivity and said alignment piece has an alignment piece thermal conductivity and said tip surrounding piece thermal conductivity is less than said tip surrounding piece thermal conductivity.

27. An injection molding apparatus as claimed in claim 17, wherein a portion of said tip surrounding piece contacts said mold component and is sized so that a selected heat transfer occurs between said tip surrounding piece and said mold component.

28. An injection molding apparatus as claimed in claim 17, wherein said tip includes a torpedo portion that extends at least to said gate, said torpedo portion being adapted for transmitting heat from said heater into melt entering said gate.

29. An injection molding apparatus as claimed in claim 17, further comprising a valve pin system that includes a valve pin and an actuator, wherein said valve pin has a closing surface and is movable through said tip melt channel between a closed position wherein said closing surface cooperates with said gate to inhibit melt flow through said gate, and an open position wherein said valve pin is spaced from said gate to permit melt flow through said gate, said valve pin has a valve pin alignment surface, said tip has a tip alignment surface positioned in said tip melt channel, and said valve pin alignment surface and said tip alignment surface are adapted to cooperate to align said valve pin with respect to said tip and with respect to said gate, and wherein said actuator is operatively connected to said valve pin.

30. An injection molding apparatus as claimed in claim 29, wherein said valve pin alignment surface is separate from said closing surface.

31. An injection molding apparatus as claimed in claim 17, wherein said tip has a tip alignment surface that is frusto-conical and said alignment piece has an alignment piece alignment surface that is configured to mate with said tip alignment surface.

32. An injection molding apparatus as claimed in claim 17, further comprising a heater, wherein said heater is thermally connected to said nozzle body for heating melt in said nozzle body melt passage.

33. A nozzle for an injection molding apparatus, said injection molding apparatus including a manifold, and a mold component, said manifold having at least one runner therein, said at least one runner being downstream from a melt source, said mold component defining at least one mold cavity, said mold component defining a gate into each mold cavity, said gate defining an axis, said mold component having a mold component alignment surface thereon, said nozzle comprising:

a nozzle body, wherein said nozzle body defines a nozzle body melt passage, said nozzle body melt passage is adapted to be in fluid communication with and downstream from said at least one runner;

a tip that is removably connected to said nozzle body, wherein said tip defines a tip melt passage, said tip melt passage is downstream from and in fluid communication with said nozzle body melt passage, and said tip melt passage is adapted to be upstream from and in fluid communication with said gate;

a tip surrounding piece that is removably connected with respect to said nozzle body; and

an alignment piece positioned between said tip and said tip surrounding piece.

34. A nozzle as claimed in claim 33, wherein said tip has a tip thermal conductivity, said alignment piece has an alignment piece thermal conductivity, and said alignment piece thermal conductivity is less than said tip thermal conductivity.

35. A nozzle as claimed in claim 33, wherein said tip surrounding piece has a tip surrounding piece thermal conductivity and said tip has a tip thermal conductivity and said tip surrounding piece thermal conductivity is less than said tip thermal conductivity.

36. A nozzle as claimed in claim 33, wherein said tip surrounding piece has a tip surrounding piece thermal conductivity and said alignment piece has an alignment piece thermal conductivity and said tip surrounding piece thermal conductivity is less than said tip surrounding piece thermal conductivity.

37. A nozzle as claimed in claim 33, further comprising a valve pin system that includes a valve pin and an actuator, wherein said valve pin has a closing surface and is movable through said tip melt channel between a closed position wherein said closing surface is adapted to cooperate with said gate to inhibit melt flow through said gate, and an open position wherein said valve pin is adapted to be spaced from said gate to permit melt flow through said gate, said valve pin has a valve pin alignment surface, said tip has a tip alignment surface positioned in said tip melt channel, and said valve pin alignment surface and said tip alignment surface are adapted to cooperate to align said valve pin with respect to said tip and with respect to said gate, and wherein said actuator is operatively connected to said valve pin.

38. A nozzle as claimed in claim 37, wherein said valve pin alignment surface is separate from said closing surface.

39. A nozzle as claimed in claim 33, wherein said tip has a tip alignment surface that is frusto-conical and said alignment piece has an alignment piece alignment surface that is configured to mate with said tip alignment surface.

40. A nozzle for an injection molding apparatus, said injection molding apparatus including and a mold component, said mold component defining at least one mold cavity, said mold component defining a gate into each mold cavity, said nozzle comprising:

a nozzle body, wherein said nozzle body defines a nozzle body melt passage, said nozzle body melt passage is adapted to be in fluid communication with and downstream from a melt source;

a tip that is removably connected to said nozzle body, wherein said tip defines a tip melt passage, said tip melt passage is downstream from and in fluid communication with said nozzle body melt passage, and said tip melt passage is adapted to be upstream from and in fluid communication with said gate;

a tip surrounding piece that is removably connected with respect to said nozzle body; and

a tip retaining piece positioned between said tip surrounding piece and said tip, wherein said tip surrounding piece retains said tip through said tip retaining piece.

41. A nozzle as claimed in claim 40, wherein said tip is made from a tip material having a first thermal conductivity, and said tip retaining piece is made from a tip retaining piece material having a second thermal conductivity that is lower than the first thermal conductivity.

42. A nozzle as claimed in claim 40, wherein said tip and said tip surrounding piece are free of contact with one another.

43. A nozzle for an injection molding apparatus, said injection molding apparatus including a mold component, said mold component defining at least

one mold cavity, said mold component defining a gate into each mold cavity, said gate defining an axis, said nozzle comprising:

a nozzle body, wherein said nozzle body defines a nozzle body melt passage, said nozzle body melt passage is adapted to be in fluid communication with and downstream from said at least one runner;

a tip that is removably connected with respect to said nozzle body, wherein said tip defines a tip melt passage, said tip melt passage is downstream from and in fluid communication with said nozzle body melt passage, and said tip melt passage is adapted to be upstream from and in fluid communication with said gate, the tip having an upstream end and a downstream end, the tip having at least one upstream alignment surface that cooperates with an alignment surface on another component of the nozzle to align the tip with respect to the nozzle body upstream from said downstream end;

a tip surrounding piece that is removably connected with respect to said nozzle body; and

an alignment piece positioned between said tip and said tip surrounding piece, wherein the alignment piece contacts and aligns the tip downstream from the upstream alignment surface.

44. A nozzle as claimed in claim 43, wherein said tip has a tip thermal conductivity, said alignment piece has an alignment piece thermal conductivity, and said alignment piece thermal conductivity is less than said tip thermal conductivity.

45. A nozzle as claimed in claim 43, wherein said tip surrounding piece has a tip surrounding piece thermal conductivity and said tip has a tip thermal conductivity and said tip surrounding piece thermal conductivity is less than said tip thermal conductivity.

46. A nozzle as claimed in claim 43, wherein said tip surrounding piece has a tip surrounding piece thermal conductivity and said alignment piece has an

alignment piece thermal conductivity and said tip surrounding piece thermal conductivity is less than said tip surrounding piece thermal conductivity.

47. A nozzle as claimed in claim 43, further comprising a valve pin system that includes a valve pin and an actuator, wherein said valve pin has a closing surface and is movable through said tip melt channel between a closed position wherein said closing surface is adapted to cooperate with said gate to inhibit melt flow through said gate, and an open position wherein said valve pin is adapted to be spaced from said gate to permit melt flow through said gate, said valve pin has a valve pin alignment surface, said tip has a tip alignment surface positioned in said tip melt channel, and said valve pin alignment surface and said tip alignment surface are adapted to cooperate to align said valve pin with respect to said tip and with respect to said gate, and wherein said actuator is operatively connected to said valve pin.

48. A nozzle as claimed in claim 47, wherein said valve pin alignment surface is separate from said closing surface.

49. A nozzle as claimed in claim 43, wherein said tip has a tip alignment surface that is frusto-conical and said alignment piece has an alignment piece alignment surface that is configured to mate with said tip alignment surface.

50. A nozzle for an injection molding apparatus, said injection molding apparatus including a mold component, said mold component defining at least one mold cavity, said mold component defining a gate into each mold cavity, said gate defining an axis, said nozzle comprising:

a nozzle body, wherein said nozzle body defines a nozzle body melt passage, said nozzle body melt passage is adapted to be in fluid communication with and downstream from said at least one runner;

a tip that is removably connected with respect to said nozzle body, wherein said tip defines a tip melt passage, said tip melt passage is downstream from and in fluid communication with said nozzle body melt

passage, and said tip melt passage is adapted to be upstream from and in fluid communication with said gate, the tip having an upstream end and a downstream end, wherein the downstream end of the tip is generally axially close to the gate;

a tip surrounding piece that is removably connected with respect to said nozzle body, the tip surrounding piece having an upstream end and a downstream end, wherein the downstream end of the tip surrounding piece is generally axially close to the gate; and

an alignment piece positioned between said tip and said tip surrounding piece, wherein the alignment piece is proximate the downstream end of at least one of the tip surrounding piece and the tip, to align the tip generally close to the gate.

51. A nozzle as claimed in claim 50, wherein said tip has a tip thermal conductivity, said alignment piece has an alignment piece thermal conductivity, and said alignment piece thermal conductivity is less than said tip thermal conductivity.

52. A nozzle as claimed in claim 50, wherein said tip surrounding piece has a tip surrounding piece thermal conductivity and said tip has a tip thermal conductivity and said tip surrounding piece thermal conductivity is less than said tip thermal conductivity.

53. A nozzle as claimed in claim 50, wherein said tip surrounding piece has a tip surrounding piece thermal conductivity and said alignment piece has an alignment piece thermal conductivity and said tip surrounding piece thermal conductivity is less than said tip surrounding piece thermal conductivity.

54. A nozzle as claimed in claim 50, further comprising a valve pin system that includes a valve pin and an actuator, wherein said valve pin has a closing surface and is movable through said tip melt channel between a closed position wherein said closing surface is adapted to cooperate with said gate to

inhibit melt flow through said gate, and an open position wherein said valve pin is adapted to be spaced from said gate to permit melt flow through said gate, said valve pin has a valve pin alignment surface, said tip has a tip alignment surface positioned in said tip melt channel, and said valve pin alignment surface and said tip alignment surface are adapted to cooperate to align said valve pin with respect to said tip and with respect to said gate, and wherein said actuator is operatively connected to said valve pin.

55. A nozzle as claimed in claim 54, wherein said valve pin alignment surface is separate from said closing surface.

56. A nozzle as claimed in claim 50, wherein said tip has a tip alignment surface that is frusto-conical and said alignment piece has an alignment piece alignment surface that is configured to mate with said tip alignment surface.

57. A nozzle for an injection molding apparatus, said injection molding apparatus including a mold component, said mold component defining at least one mold cavity, said mold component defining a gate into each mold cavity, the gate is positioned at the end of a nozzle well in the mold component, said nozzle comprising:

a nozzle body, wherein said nozzle body defines a nozzle body melt passage, said nozzle body melt passage is adapted to be in fluid communication with and downstream from said at least one runner;

a tip that is removably connected with respect to said nozzle body, wherein said tip defines a tip melt passage, said tip melt passage is downstream from and in fluid communication with said nozzle body melt passage, and said tip melt passage is adapted to be upstream from and in fluid communication with said gate;

a tip surrounding piece that is removably connected with respect to said nozzle body, the tip surrounding piece is adapted to contacts the mold block in the nozzle well to align the tip surrounding piece with respect to the nozzle well; and

an alignment piece positioned between said tip and said tip surrounding piece, wherein the alignment piece is aligned by the tip surrounding piece, and wherein the tip is aligned by the alignment piece.

58. A nozzle as claimed in claim 57, wherein said tip has a tip thermal conductivity, said alignment piece has an alignment piece thermal conductivity, and said alignment piece thermal conductivity is less than said tip thermal conductivity.

59. A nozzle as claimed in claim 57, wherein said tip surrounding piece has a tip surrounding piece thermal conductivity and said tip has a tip thermal conductivity and said tip surrounding piece thermal conductivity is less than said tip thermal conductivity.

60. A nozzle as claimed in claim 57, wherein said tip surrounding piece has a tip surrounding piece thermal conductivity and said alignment piece has an alignment piece thermal conductivity and said tip surrounding piece thermal conductivity is less than said tip surrounding piece thermal conductivity.

61. A nozzle as claimed in claim 57, further comprising a valve pin system that includes a valve pin and an actuator, wherein said valve pin has a closing surface and is movable through said tip melt channel between a closed position wherein said closing surface is adapted to cooperate with said gate to inhibit melt flow through said gate, and an open position wherein said valve pin is adapted to be spaced from said gate to permit melt flow through said gate, said valve pin has a valve pin alignment surface, said tip has a tip alignment surface positioned in said tip melt channel, and said valve pin alignment surface and said tip alignment surface are adapted to cooperate to align said valve pin with respect to said tip and with respect to said gate, and wherein said actuator is operatively connected to said valve pin.

62. A nozzle as claimed in claim 61, wherein said valve pin alignment surface is separate from said closing surface.

63. A nozzle as claimed in claim 57, wherein said tip has a tip alignment surface that is frusto-conical and said alignment piece has an alignment piece alignment surface that is configured to mate with said tip alignment surface.

64. An injection molding apparatus, comprising:

a manifold, a mold component and at least one nozzle,

wherein said manifold has at least one runner therein and said at least one runner is adapted to be downstream from a melt source,

wherein said mold component defines at least one mold cavity said mold component defines a gate into each mold cavity, wherein the gate is positioned at the end of a nozzle well in the mold component,

wherein each said nozzle includes a nozzle body, a tip, a tip surrounding piece, and an alignment piece,

wherein said nozzle body defines a nozzle body melt passage, and said nozzle body melt passage is in fluid communication with and downstream from one of said at least one runner,

wherein said tip is removably connected to said nozzle body, wherein said tip defines a tip melt passage, said tip melt passage is downstream from and in fluid communication with said nozzle body melt passage, and is upstream from and in fluid communication with said gate,

wherein said tip surrounding piece is removably connected with respect to said nozzle body, the tip surrounding piece is adapted to contacts the mold block in the nozzle well to align the tip surrounding piece with respect to the nozzle well,

wherein said alignment piece is positioned between said tip and said tip surrounding piece, and wherein the alignment piece is aligned by the tip surrounding piece, and wherein the tip is aligned by the alignment piece.

65. An injection molding apparatus as claimed in claim 64, wherein said tip has a tip thermal conductivity, said alignment piece has an alignment piece thermal conductivity, and said alignment piece thermal conductivity is less than said tip thermal conductivity.

66. An injection molding apparatus as claimed in claim 64, wherein said tip surrounding piece has a tip surrounding piece thermal conductivity and said tip has a tip thermal conductivity and said tip surrounding piece thermal conductivity is less than said tip thermal conductivity.

67. An injection molding apparatus as claimed in claim 64, wherein said tip surrounding piece has a tip surrounding piece thermal conductivity and said alignment piece has an alignment piece thermal conductivity and said tip surrounding piece thermal conductivity is less than said tip surrounding piece thermal conductivity.

68. An injection molding apparatus as claimed in claim 64, further comprising a valve pin system that includes a valve pin and an actuator, wherein said valve pin has a closing surface and is movable through said tip melt channel between a closed position wherein said closing surface is adapted to cooperate with said gate to inhibit melt flow through said gate, and an open position wherein said valve pin is adapted to be spaced from said gate to permit melt flow through said gate, said valve pin has a valve pin alignment surface, said tip has a tip alignment surface positioned in said tip melt channel, and said valve pin alignment surface and said tip alignment surface are adapted to cooperate to align said valve pin with respect to said tip and with respect to said gate, and wherein said actuator is operatively connected to said valve pin.

69. An injection molding apparatus as claimed in claim 68, wherein said valve pin alignment surface is separate from said closing surface.

70. An injection molding apparatus as claimed in claim 64, wherein said tip has a tip alignment surface that is frusto-conical and said alignment piece has an alignment piece alignment surface that is configured to mate with said tip alignment surface.

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